

places of the Cape catalogue before us, for the stars specified above, when arranged in zones of declination:—

South decl.	$\Delta\alpha$	$\Delta\delta$	No. of stars
34-46 ...	-0°004 ...	+0°33 ...	39
46-56 ...	-0°008 ...	+0°42 ...	34
56-66 ...	+0°009 ...	+0°45 ...	30
66-80 ...	-0°049 ...	+0°44 ...	16

The discordances in right ascension for the first three zones are not larger than would be anticipated, bearing in mind the fact that Prof. Boss has not corrected his places for personality depending on magnitude. The mean correction for the polar zone is, however, quite uncertain, the mean (without regard to sign) of the individual discordances from the mean value entered above being as much as 0.102s., pointing to the extreme uncertainty with which right ascensions of even so-called "standard" stars situated in this portion of the sky are carried forward for a term of years.

There appears to be a well-marked systematic discordance of about 0".4 in the declinations. This, however, is not the place in which to inquire into the origin of this discordance, which will doubtless receive due attention at the hands of Prof. Boss.

A melancholy interest attaches to the publication under review. Sir D. Gill, in a short preface, addresses a few words of farewell to the members of the staff of the Cape Observatory, referring to this catalogue as the last that will probably appear in connection with his name. The splendid work performed by Sir D. Gill at the Cape Observatory need not be emphasised here. It must be a satisfaction to him, as well as to astronomers all the world over, that he was able to accomplish another excellent piece of work before the close of his official career, during which he has done so much to enhance the fair fame of British astronomy.

A. M. W. D.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—Dr. John Cadman, one of H.M. inspectors of mines, has been appointed to the chair of mining rendered vacant by the resignation of Prof. R. A. S. Redmayne.

GLASGOW.—The University Court has established a lectureship in bacteriology, and appointed Dr. C. H. Browning as the first lecturer. The Court has also established a lectureship in geography, to which an appointment will be made in October.

THE annual meeting of the Midland Agricultural and Dairy College will be held on Monday, July 27, at 3.15 p.m., when the report on the year's work will be presented. The Duke of Portland will address the meeting and present the certificates gained during last session.

To secure the best results, it is highly important that technical colleges should work in close connection with the needs of local industries. A distinguishing characteristic of the prospectus of the day classes at the Heriot-Watt College, Edinburgh, is the excellent system of co-ordinating the more theoretical work of the college with the practical experience gained during apprenticeship. Arrangements have been made with several of the leading firms of engineers in Edinburgh by which students of the college are allowed to begin their apprenticeship at the end of the second winter college session, returning to college the following winter to complete their third winter session. Students holding the college diploma have their term of apprenticeship reduced by a year, and in some cases either reduced premiums are charged to college students or the premiums are entirely dispensed with. The Edinburgh and Leith Corporations' gas commissioners, also, have agreed to allow students who have been three years in the chemistry department of the college to spend four summer months in the laboratories of their gas works, and thus to obtain a thorough knowledge of the analysis of fuels, products of combustion, coal gas, and coal distillation products. A two years' course of instruction in mining, again, has been arranged, which is accepted by the Home

Office as equivalent to the two years' underground training required of those who wish to obtain the mine manager's certificate. In connection with the department of technical mycology, an arrangement has been made between the college and the Brewers' Association of Scotland by which brewers' apprentices who have completed satisfactorily an approved course will receive a joint certificate awarded by the association and the college. Students who already hold a university science degree can obtain special post-graduate instruction in several departments of technology. These instances are typical of the successful efforts which are being made in Edinburgh to make technical instruction of real benefit to those employed in industrial pursuits.

ON the occasion of the visit of the King and Queen on July 9 to open the Royal Edward Dock at Avonmouth, an address was presented to their Majesties by the council and senate of the Bristol University College. After detailing the efforts which have been made to provide Bristol with a complete system of education, the address proceeds:—"We humbly trust that your Majesty will regard with satisfaction the provision that has thus been made in our city for education in its various grades, and will look with favour on our hope that our educational system will be completed and crowned by the establishment of a University in Bristol similar to those founded in recent years in other important cities of the realm. The public spirit and generosity lately shown by a member of a well-known Bristol family in promising the sum of one hundred thousand pounds towards the endowment of a Bristol University leads us to anticipate that with the help of other liberal benefactors our city may shortly be in a position to crave of your Majesty the grant of a Royal Charter for the incorporation of this University." During the course of his reply, the King said:—"It is now recognised by the great municipalities and other education authorities of my kingdom that it is their duty to provide facilities for the acquirement of special knowledge, so that young men may be enabled to obtain efficient equipment, both literary and technical, without travelling to distant Universities to obtain it. The generous emulation of rival cities in this respect is necessarily beneficial, for every addition to the practical efficiency and culture of a community, and every stimulus thereby supplied to others, are gains to the whole nation. I will take care that your petition for a grant of a charter for the incorporation of a University in Bristol is referred to a committee of my Privy Council, who will give it careful and sympathetic consideration, and then submit to me their advice." The Society of Merchant Venturers also presented an address in which reference was made to the willingness of the society to maintain a faculty of engineering in the University.

THE Department of Agriculture and Technical Instruction for Ireland has for some years been very active in encouraging the teaching of science both in Irish secondary schools and technical institutes. Technical instruction also, through the efforts of the department, is being given successfully in numerous centres throughout Ireland. Illustrated accounts of the technical work in different districts are published in the Journal of the department from time to time, and afterwards re-published for wide distribution; the latest pamphlet to be issued in this way is a well illustrated description of the facilities for technical instruction in Queenstown, by Mr. George Thompson, the principal of the technical school in that town. The department also does very useful work in providing science teachers in Irish secondary schools with careful guidance as to the best methods of teaching and the most suitable courses of work in science for boys and girls in secondary schools. We have received copies of the revised syllabuses in physics and in physiology and hygiene. The syllabuses, in addition to a general introduction describing the aim and object of the instruction, outline experimental courses of study for each of the four years during which science is taught in the secondary school. During the first two years of their study of science the pupils investigate practically the simple fundamental principles of physics and chemistry, while during the third and fourth years some specialisation is allowed, and the study becomes more intensive. The syllabuses are well worth the careful atten-

tion of all teachers of science in secondary schools, whether they are teaching in Ireland or elsewhere. We notice, too, that the department will, in August, 1908, award not more than six industrial scholarships—of the value of 80*l.* each, and renewable for a second and third year—to persons engaged in industries, such as the woollen, linen, leather, and tanning industries. The object of these scholarships is to enable selected persons, who must already have been engaged in one of the higher branches of the industry, to take a full course of instruction in an institution providing special courses of an approved character, with the view of training them for the management of such an industry. Candidates will be required to show that there is a reasonable expectation of their being able to find suitable employment in the industry in Ireland after the termination of their scholarships.

THE installation of Lord Morley of Blackburn as Chancellor of the University of Manchester took place on July 10. Replying to an address presented to him by the Vice-Chancellor, Mr. A. Hopkinson, Lord Morley dealt with the functions of universities. He urged those present not to allow technical teaching, valuable as that science was, to throw into a second place the true object and scope of a University. It is a remarkable and encouraging fact, he said, that there has been no disposition during the last twenty or twenty-five years among the many benefactors of these institutions to limit their benefactions. On the contrary, some of the most remarkable of these benefactions have been for music, for philosophy, for theology, and for literature. This would seem to justify the hope that merely and purely technical teaching will not drive out teaching of the University type. After the installation Lord Morley and Mr. Arthur Balfour were entertained at luncheon. Mr. Balfour, in replying to a toast, said:—"In order to pursue knowledge to the best advantage, knowledge must be pursued for her own sake; and she is more likely to be successfully pursued for her own sake in a great academical house than by any other method or machinery which the wit of man has as yet devised. As knowledge is to be pursued for its own sake, mankind has found its greatest instrument for the better prosecution of knowledge in science. The great advancement of mankind is to be looked for in our ever-increasing knowledge of the secrets of nature—secrets, however, which are not to be unlocked by the men who pursue them for purely material ends, but secrets which are open in their fulness only to men who pursue them in a disinterested spirit. The motive power which is really going to change the external surface of civilisation, which is going to add to the well-being of mankind, which is going to stimulate the imagination of all those who are interested in the universe in which our lot is cast, that lies after all with science. I would rather be known," Mr. Balfour continued, "as having added to the sum of our knowledge of the truth of nature than anything else I can imagine. Unfortunately for me, my opportunities have lain in different directions; but the happiest of men surely are those whom fortune has given time, leisure, the opportunity, and, above all, the genius which enables them to penetrate into the secrets of nature in such a way that, perhaps unknown to themselves, unknown even to the generation in which they are born, something will have been given to mankind which posterity can develop into some great practical discovery on which the felicity of mankind may depend."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 12.—"On Reciprocal Innervation in Vaso-motor Reflexes and the Action of Strychnine and of Chloroform thereon." By Dr. W. M. Bayliss, F.R.S.

(1) In depressor reflexes there is, along with inhibition of tone in the vaso-constrictor centres, an excitation of vaso-dilator centres. This has been shown in the cases of the submaxillary gland, the penis, the hind-limb, the external ear, and probably the tongue.

(2) Correspondingly, in pressor reflexes, along with excitation of constrictors, there is, in appropriate con-

ditions, inhibition of dilator tone. This is, however, more difficult to demonstrate.

(3) Similarly, in the local, or Lovén, reflexes, there is also both excitation of dilators and inhibition of constrictors.

(4) The action of strychnine is to convert the inhibitory phase of all vascular reflexes into an excitation, so that:—

(5) The depressor nerve produces a rise of blood-pressure under full doses of the alkaloid. It does this by exciting the constrictor centre by the same mechanism which normally inhibits it.

(6) In the "dilator" animal under strychnine, pressor reflexes become depressor, in that inhibition of dilators is converted into excitation.

(7) Various parts (synapses) of the reflex arc are differently sensitive to the alkaloid, the synapse of the pressor fibres with the constrictor centre being the first to show paralysis as the dose is increased.

(8) In the "dilator" animal strychnine causes a fall of blood-pressure on injection by exciting dilator centres. In the normal animal the first dose causes a rise, and subsequent ones a fall of pressure, since the first dose, if not too small, after exciting the vaso-constrictor centre, paralyses the synapses concerned, so that the simultaneous excitation of the dilator centres can now make itself felt.

(9) The excitation of constrictors produced by reversal of inhibition is more resistant to the alkaloid than that produced in the normal way.

(10) Asphyxial blood does not act directly on the efferent constrictor neurones, since it has no action at a stage of strychnine poisoning at which the depressor still excites constriction, by reversal of inhibition.

(11) Chloroform converts pressor into depressor reflexes (in the rabbit) by reversal of excitation of constrictors into inhibition.

(12) This effect of chloroform is not exerted on the efferent neurones directly, but at some point considerably earlier in the reflex arc. This is shown by the fact that asphyxial blood causes rise of pressure when excitation of sensory nerves causes fall.

June 4.—"The Optical Constants of Gypsum at Different Temperatures, and the Mitscherlich Experiment." By Dr. A. E. H. Tutton, F.R.S.

The experimental work on selenite now described confirms the author's previously published conclusion, derived from other examples, that the phenomenon of crossed-axial-plane dispersion is due to very low double refraction, combined with close approximation of the intermediate index of refraction to one of the extreme indices, and to the fact that change of wave-length of the light or change of temperature, or both, cause the intermediate index to approach still nearer to the extreme one in question until it becomes identical with it, and eventually to pass it, the relative positions of the two indices thus becoming reversed. The uniaxial rectangular cross and circular rings are produced at the critical point of identity. This critical point is a function of both wave-length and temperature, being a fixed one only for a particular wave-length and specific temperature. The temperature has a maximum for wave-length 573 on the greenish-yellow side of the D lines (589). The optic axial angle has a maximum for the same wave-length 573, for all temperatures below that of the crossing of the optic axes, and a minimum for temperatures superior thereto up to the temperature of decomposition (120°) of selenite. The change of orientation of the median lines (bisectrices of the optic axial acute and obtuse angles) within the symmetry plane, at any specific temperature, also exhibits a critical limit for this greenish-yellow light of wave-length 573, which is thus a very important radiation in connection with the optics of selenite. The range of temperature which includes the production of the uniaxial figure for all colours of the spectrum does not exceed 4°, varying in different crystals from 3°·5 to 4°. The absolute temperatures of crossing for the four crystals investigated varied 9°, the maxima (for wave-length 573) varying from 105°·5 to 114°·5, corrected for conduction of crystal holder.

Zoological Society, June 16.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—Photographs and fragments of skin and bone of a mammoth and a rhinoceros discovered in an ozokerite mine at Starunia, Galicia: